

WHAT IS CLAIMED IS:

1. A method for generating a signal indicative of a pressure oscillation in a chamber, said method comprising:

sensing a pressure within the chamber;

generating a signal that is relative to the sensed pressure;

digitizing the signal;

transforming the digitized signal from a time domain to a frequency domain to generate an energy spectrum; and

analyzing the energy spectrum to determine an energy spike indicative of a substantially non-random component of the digitized signal.

2. A method in accordance with Claim 1 wherein sensing a pressure within the chamber comprises sensing deflection of a diaphragm coupled in fluid communication with the chamber.

3. A method in accordance with Claim 2 wherein sensing deflection of a diaphragm coupled in fluid communication with the chamber comprises sensing deflection of the diaphragm using an eddy current sensor.

4. A method in accordance with Claim 1 wherein the chamber is a combustor and wherein sensing a pressure within the chamber comprises sensing a dynamic pressure indicative of humming within the combustor.

5. A method in accordance with Claim 1 wherein the sensed pressure includes a static pressure component and a dynamic pressure component and wherein generating a signal that is relative to the sensed pressure comprises generating a signal relative to the dynamic pressure component.

6. A method in accordance with Claim 5 wherein generating a signal that is relative to the dynamic pressure component comprises generating an analog electrical signal relative to the dynamic pressure component.

7. A method in accordance with Claim 1 wherein digitizing the signal comprises periodically sampling the signal using an analog-to-digital converter.

8. A method in accordance with Claim 7 wherein digitizing the signal further comprises convolving the digitized signal.

9. A method in accordance with Claim 1 wherein transforming the digitized signal from the time domain to the frequency domain comprises applying a Fourier transform to the digitized signal.

10. A method in accordance with Claim 1 wherein transforming the digitized signal comprises transforming the digitized signal in real-time.

11. A method in accordance with Claim 1 wherein transforming the digitized signal from the time domain to the frequency domain comprises:

converting the digitized signal into an analog signal using a digital-to-analog converter; and

applying a Fourier transform to the analog signal.

12. A method in accordance with Claim 1 wherein analyzing the energy spectrum comprises:

determining a signal energy spike amplitude at a predetermined frequency of the energy spectrum, the frequency correlative to a combustor humming frequency;

comparing the spike amplitude to a predetermined threshold energy amplitude limit; and

reducing humming based on the comparison.

13. A method in accordance with Claim 1 wherein analyzing the energy spectrum comprises:

determining a signal energy spike amplitude at a frequency of the energy spectrum;

comparing the spike to a predetermined threshold energy amplitude limit corresponding to the respective frequency; and

reducing humming based on the comparison.

14. A method in accordance with Claim 1 wherein the signal includes a noise component and a repetitive signal component and wherein analyzing the energy spectrum comprises amplifying the repetitive signal component while not substantially amplifying the noise component.

15. A system for generating a signal indicative of a pressure oscillation in a chamber, said system comprising:

a sensor positioned in fluid communication with the chamber, said sensor configured to generate an output signal relative to pressure within the chamber;

a sampling circuit configured to periodically receive the output signal, said sampling circuit configured to digitize the received signal;

a Fourier transform circuit configured to generate an energy spectrum of the digitized signal; and

an analyzer configured to process the energy spectrum to determine an energy spike indicative of a substantially non-random component of the digitized signal.

16. A system in accordance with Claim 15 wherein said sensor comprises a diaphragm that is configured to deflect relative to a pressure variation within the chamber.

17. A system in accordance with Claim 16 wherein said sensor further comprises a transducer configured to generate an output signal relative to the deflection.

18. A system in accordance with Claim 15 wherein said sensor comprises an eddy current transducer.

19. A system in accordance with Claim 15 wherein the chamber is a combustor and wherein said sensor is configured to sense a dynamic pressure indicative of humming within the combustor.

20. A system in accordance with Claim 19 wherein the combustor includes a static pressure component and a dynamic pressure component and wherein said sensor is configured generate a signal relative to the dynamic pressure component.

21. A system in accordance with Claim 15 wherein said sampling circuit comprises an analog-to-digital converter.

22. A system in accordance with Claim 15 wherein said sampling circuit is coupled to a convolution circuit that is configured to generate a complex impedance value relative to the sensor output signal.

23. A system in accordance with Claim 15 wherein said analyzer is configured to:

determine a signal energy spike amplitude at a predetermined frequency of the energy spectrum, the frequency correlative to a combustor humming frequency;

compare the spike amplitude to a predetermined threshold energy amplitude limit; and

employ the comparison to facilitate reducing humming.

24. A system in accordance with Claim 15 wherein said analyzer is configured to:

determine a signal energy spike amplitude at a frequency of the energy spectrum;

compare the spike to a predetermined threshold energy amplitude limit corresponding to the respective frequency; and

employ the comparison to facilitate reducing humming.

25. A system in accordance with Claim 15 wherein the signal includes a noise component and a repetitive signal component and wherein said analyzer is configured to amplify the repetitive signal component while not substantially amplifying the noise component.

26. A system for generating a signal indicative of humming in a gas turbine combustor, said system comprising:

a sensor positioned in fluid communication with the chamber, said sensor comprising:

a diaphragm configured to deflect relative to a pressure variation within the chamber, and

an eddy current transducer configured to generate an output signal relative to the deflection;

a sampling circuit comprising an analog-to-digital converter, said sampling circuit configured to:

periodically receive the output signal, and

digitize the received signal;

a convolution circuit configured to generate a complex impedance value relative to the sensor output signal;

a Fourier transform circuit configured to generate an energy spectrum of the digitized signal; and

an analyzer configured to process the energy spectrum, said analyzer configured to:

determine a signal energy spike amplitude at a frequency of the energy spectrum;

compare the spike to a predetermined threshold energy amplitude limit corresponding to the respective frequency; and

employ the comparison to facilitate reducing humming.

27. A system in accordance with Claim 26 wherein said analyzer is configured to determine a signal energy spike amplitude at a predetermined frequency of the energy spectrum, the frequency correlative to a combustor humming frequency;

28. A system in accordance with Claim 26 wherein the signal includes a noise component and a repetitive signal component and wherein said analyzer is configured to amplify the repetitive signal component while not substantially amplifying the noise component.